

smallest doses (as we see from experiments with animals), that nature actively eliminates this deleterious substance as rapidly as possible from the body.

Meurer has made experiments on horses (animals which, as is well known, can bear large doses of arsenic), and Von Bibra on rabbits, from whence it appears that most of the arsenic is carried off with the solid excrements. Both observers also found the poison in the urine in no inconsiderable quantity. Of the solid parts of the animal body, the excreting organs, viz. the liver and kidneys, are those in which most arsenic is found; it has, however, also been detected in the heart, lungs, brain, and muscles. Some of these results are confirmed by the experiments of Duflos and Hirsch.

Schnedermann and Knop could detect no arsenic in the bones of a pig which had lived for three quarters of a year in the neighbourhood of the silver works of Andreasberg, where cattle and poultry do not thrive in consequence of the evolution of arsenical vapours.—*Lehmann's Physiological Chemistry*, vol. i. p. 449. Translated by Dr. GEORGE E. DAY. Cavendish Society Publications.

T. R. B.

**75. Mineral Constituents in the Human Body. Copper and Lead.**—Both these metals have been found in very minute quantity in the healthy body by Devergie, Lefortier, Orfila, Dechamps, and Millon, and were regarded by these chemists as integral constituents of all the soft parts, as well as of the blood; but it is only recently that any very decisive experiments on this subject have been instituted, and they, at all events, prove beyond a doubt that copper exists in the blood of some of the lower animals, and in the bile of the ox and man.

Millon believed that he had found them in the *blood*, but Melsens has brought forward reasons and even direct experiments against this view. Since, however, the presence of copper in the bile of man and the ox has been determined with certainty, the blood must give traces of this metal even though they be almost inappreciable. Moreover, E. Harless has found copper in the blood and more particularly in the liver of some of the lower animals, viz. the cephalopoda, ascidia, and mollusca. This observer found copper in the liver of *helix pomatia*; Von Bibra found it in the liver of *cancer pagurus*, *acanthias*, and *Zeus*, and observed that it stood in an inverse ratio to the iron. Copper was originally found in the gall and bile stones by Bertozzi, and subsequently by Heller, Gorup Besanez, Bramson, and Orfila. I have been equally unsuccessful in demonstrating the presence of copper, either in the human liver or the liver of the frog; in the latter case, my experiment was made on 250 livers; and I have also failed in obtaining any indication of copper or lead in the blood, although I followed Millon's instructions.

There can be no doubt that the small quantities of copper which have been actually found in the fluids of the higher animals are only to be regarded as incidental constituents, while the experiments of Harless seem to indicate that, in the lower animals, the copper stands in an essential relation to the blood-corpuscles.

All the investigations which have hitherto been made seem to indicate the liver as the organ in which deleterious substances, and especially those of a metallic nature, as, for instance, arsenic, lead, antimony, bismuth, &c., are accumulated in order that they may gradually be eliminated with the bile. Hence, even if copper were constantly found in the blood or in the bile, it would afford no reason why we should regard this metal as an integral constituent of those fluids.

As copper has not only been found in many mineral waters (as, for instance, by Will, Buchner, Keller, and Fischer), but often in plants, and even in corn (Girardin), there is no difficulty in accounting for its presence in small quantities in the organisms of the higher animals.—*Lehmann's Physiological Chemistry*.

T. R. B.

**76. Hydrocyanic Acid.**—This acid never occurs preformed in the animal organism; even in the most varied of the metamorphoses and decompositions which occur during disease, we never meet with either the free acid or a metallic cyanide. This is readily accounted for when we recollect that hydrocyanic

acid, cyanogen, and the metallic cyanides are only produced from nitrogenous substances at a high degree of temperature. But in spite of this, certain physiological chemists have shown no unwillingness to assume that hydrocyanic acid, either in congregation or in combinations, exists preformed in histogenetic substances, or to avail themselves of its formation in the explanation of various chemico-vital processes; in short, to make it take a part in the equations by which they pretend to explain the different stages in the metamorphosis of the animal tissues. We only mention it here, inasmuch as it belongs to the bodies which are produced during the artificial decomposition of animal substances; such, for example, as acetic, valerianic, and oenanthylic acids; we refer to the decomposition of hippuric acid by mere heat, and to the decomposition of histogenetic substances by bichromate of potash or binoxide of manganese and sulphuric acid.—*Lehmann's Physiological Chemistry.* T. R. B.

77. *Poisoning by Atropia applied to the Conjunctiva.*—Hospital Saint Antoine. Service of Dr. CUASSIGNAC. Thomas Halkering entered the hospital in August last with a double cataract complicated with adhesion of the iris to the crystalline. On the 31st of August, in order fully to examine the condition of the eye, there was poured in its side three or four drops of a solution made with 5 centigrammes of atropine (0.7770th of a grain) in 30 grammes (a little more than an ounce and a half) of water acidulated with acetic acid.

In half an hour vertigo occurred with wanderings of vision. In three-quarters of an hour all the symptoms of poisoning with belladonna were present, flushed face, enormously dilated pupils, and incessant hallucinations. The patient drew his coverings over him, and attempted to seize objects that he saw in the air. On attempting to rise, his legs failed under him, and he could not take two steps without being assisted. His pulse was 120 and full.

In the evening he became more calm, but the bladder was distended, and he was unable to empty it, so that the catheter had to be used.

During the night the delirium was so violent that the strait-jacket was employed.

On the morning of the 1st of September he was tranquil, and answered questions put to him. The tongue was moist, and there was much less appearance of congestion. Stupor and quickness of pulse, however, remained. He rested extremely well during the night, but during the day following hallucinations still recurred with a confusion of ideas; the pupils were still dilated. He urinated freely.

In this way all the unpleasant symptoms gradually disappeared, but it was four days before he perfectly recovered. He had lost all recollection of his illness except his delirium and its accompaniments.—*Gazette des Hôpitaux*, January 18, 1853. T. R. B.

78. *Presence of Antimony in the Organs of the Body.*—Some discussion occurred at a late meeting of the Academy, relative to the experiments of MM. Millon and Lavarsan on this subject. A case occurring in the service of M. MARCHAL (de Calvi), at Val de Grace, has a bearing on the matter.

A man very weak, labouring under double pneumonia, had been treated on the Rasone system, with large doses of tartar-emetic, and died on the fifteenth day (eight days after having ceased taking the same). Portions of the liver, kidneys, brain, and blood were submitted to experiment in large receivers. To each was added pure and fuming muriatic acid in the proportion of about one half the weight of the organic matter. The mixture was heated gently in a sand-bath, but not to boiling, and a few hours after same quantity of chlorate of potash was added. Soon after, the materials were filtered, and the substances remaining on the filter were also washed with distilled water.

A plate of tin immersed in the different liquids was soon covered with a black pulverulent deposit, which was antimony; after some hours, this plate was plunged into pure muriatic acid, and the next day the black deposit was dissolved and at the bottom of the vessels. The result was that: 1. The liver furnished a considerable quantity. 2. The kidneys a less one. 3. The blood contained it also, but in very small amount. 4. It was also present in the